

Alstom Renewable Power

Les enjeux des  
Energies Marines Renouvelables

Philippe Gilson

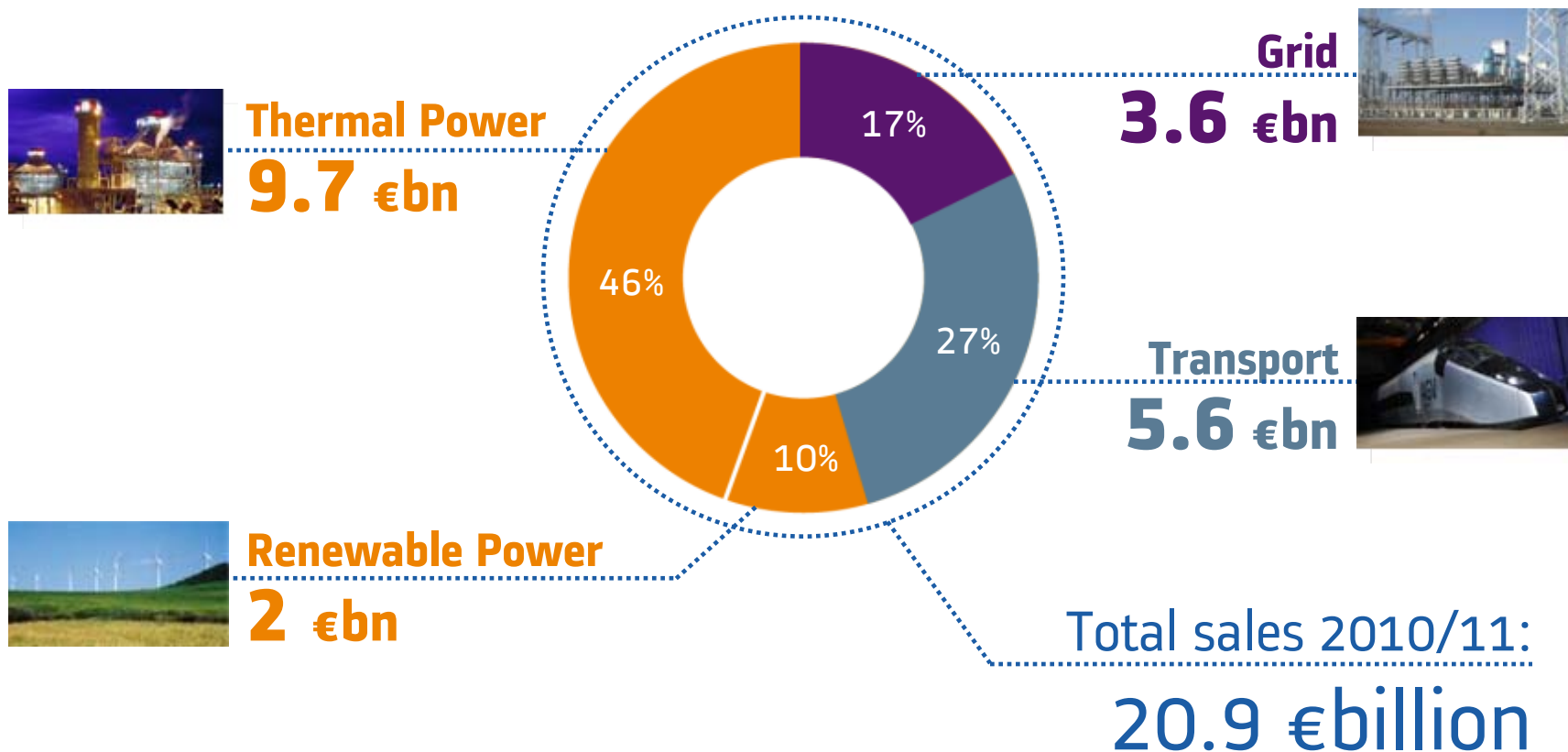
February 2012

**ALSTOM**

# Three main activities in four Sectors



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Organisation as of 4 July 2011

# Alstom Renewable Power Worldwide Presence



\*Assembly unit starting operation in November 2011

\*\* Assembly unit starting operation in 2012

# Alstom Renewable Power Technologies adapted to all Renewable energy sources



WIND OFFSHORE



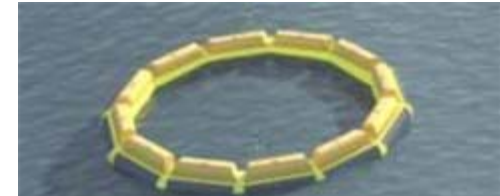
WIND ONSHORE



HYDRO



TIDAL



WAVE



SOLAR THERMAL



GEO THERMAL



BIOMASS

FOR NEW PLANTS AND FOR THE INSTALLED BASE

# Renewable Power Portfolio Timeline



**Geothermal**



**Hydro**



**ECO 100  
2009**



**ECO 110  
2011**



**Wind Off-shore Haliade 150 6MW  
2013**



**Ocean Wave Energy  
2015**



**Biomass**



**PSP Variable speed  
2008**



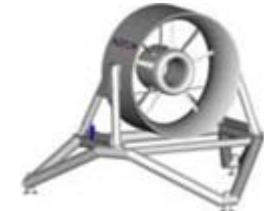
**Solar Plants  
2011**



**ECO 122  
2011**



**Ocean Tidal Energy  
2014**



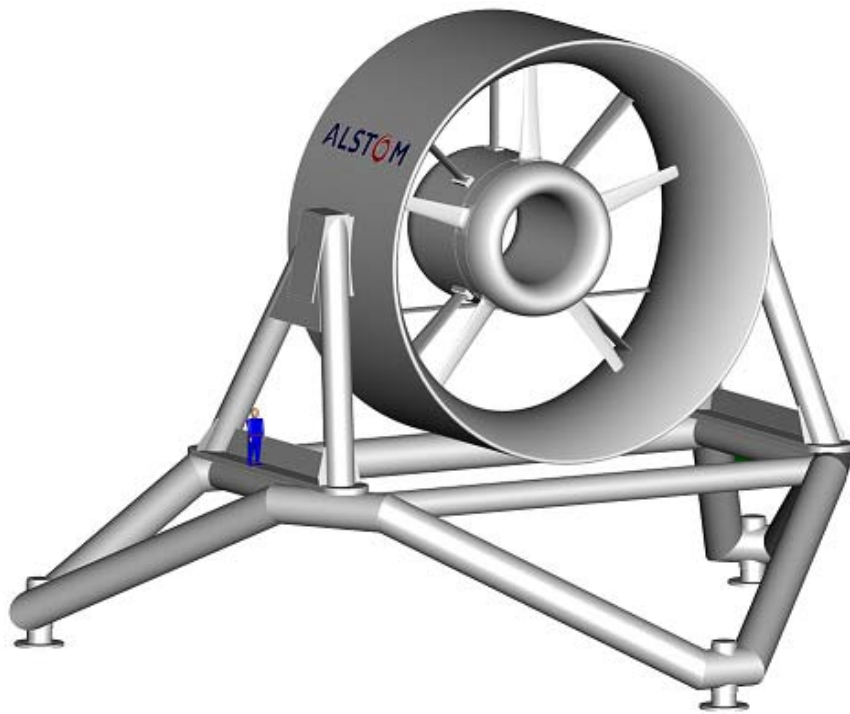
**A CONTINUOUS NEW OFFERING PIPELINE**

# Off-shore Wind



Haliade 150 (6 MW)

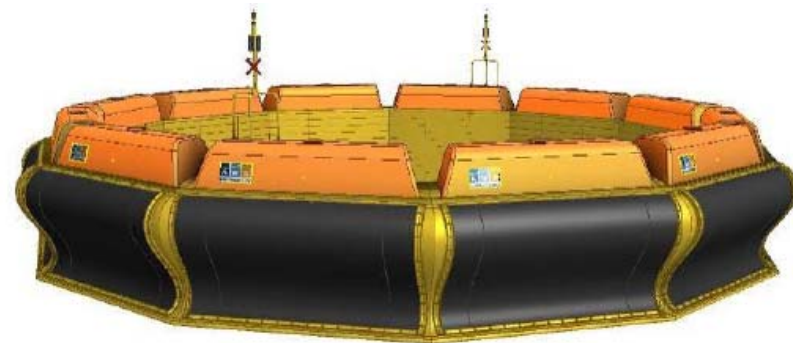
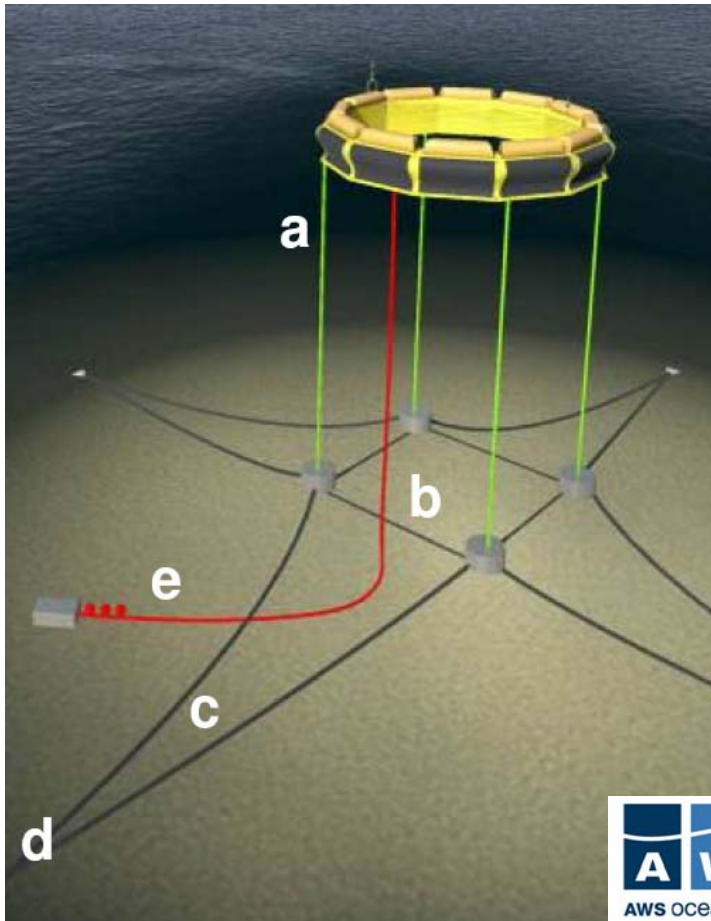
# Tidal Stream



50 000 to 100 000 TISEC global market

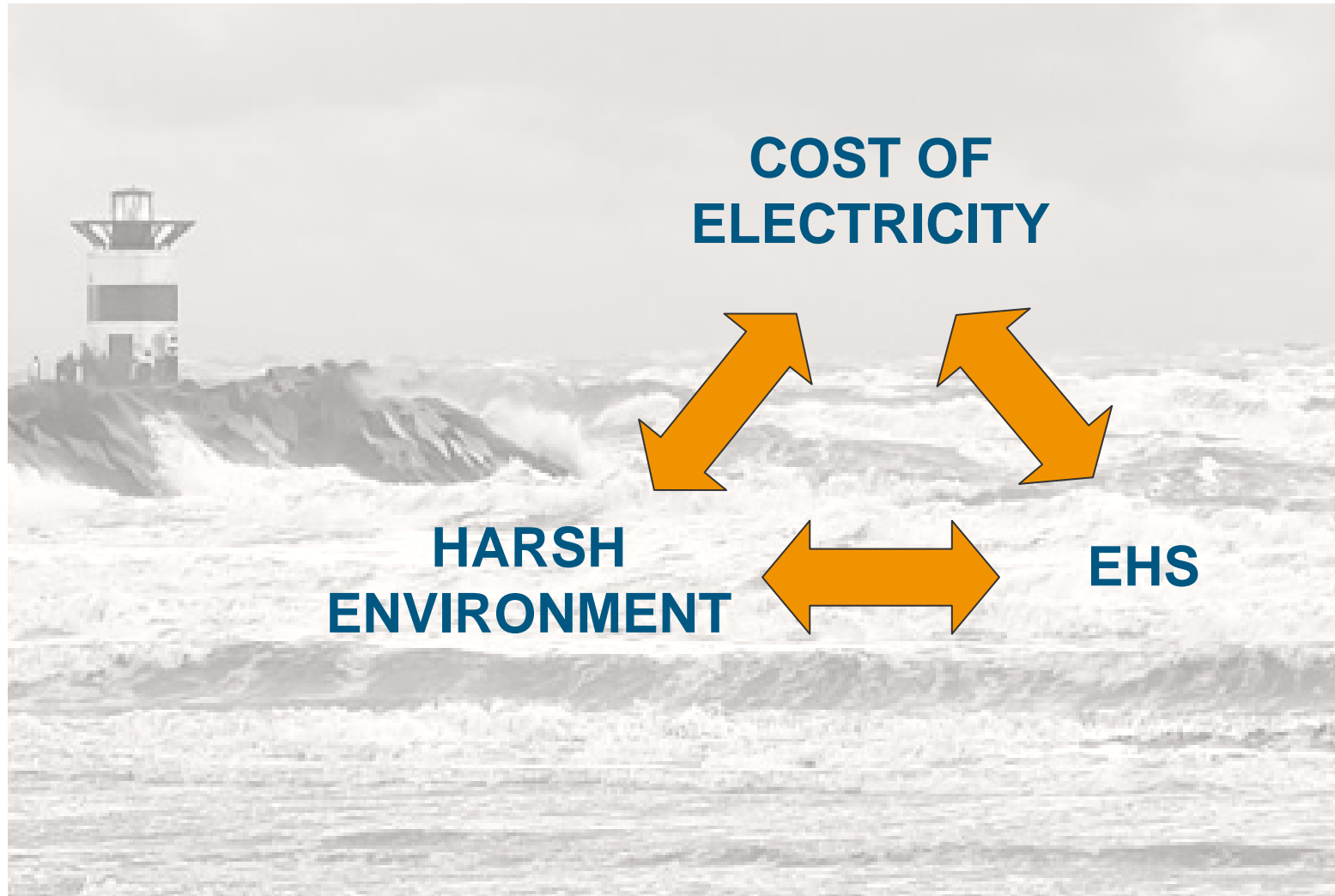
# Wave Energy

June 2011 : 40 % equity of AWS Ocean Energy Ltd  
December 2011 : JV with SSER – 200 MW wave farm

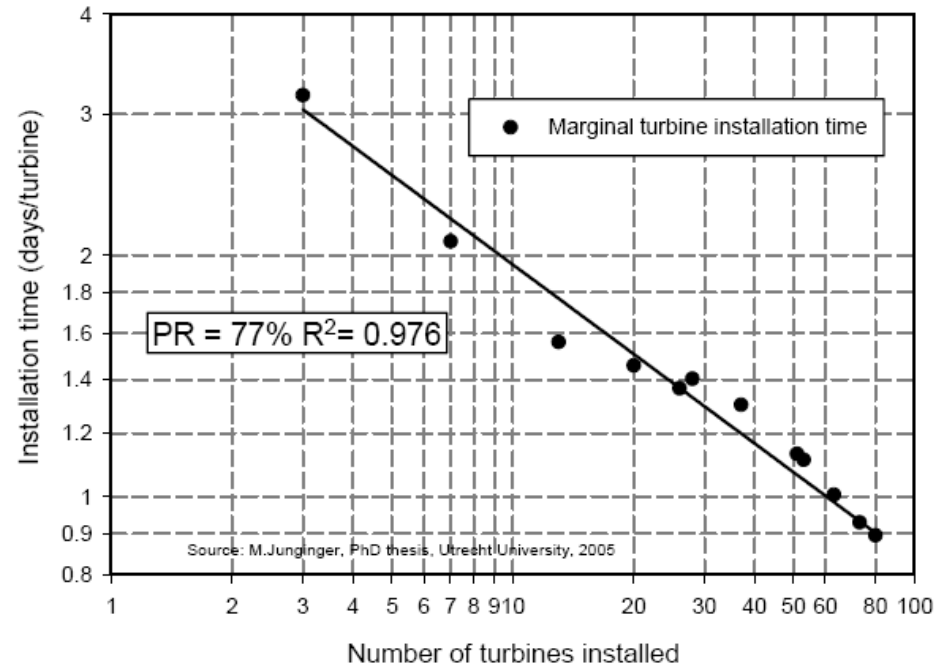
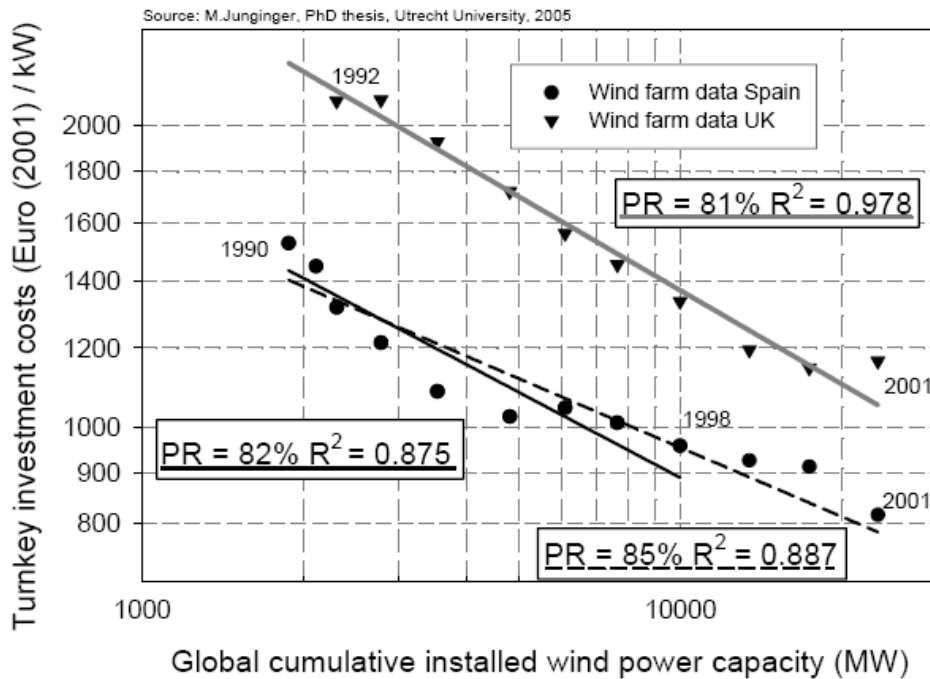


200 to 300 GW market

# Main Industrial Challenge



# The cost challenge



Strong R&D and Volume Production needed

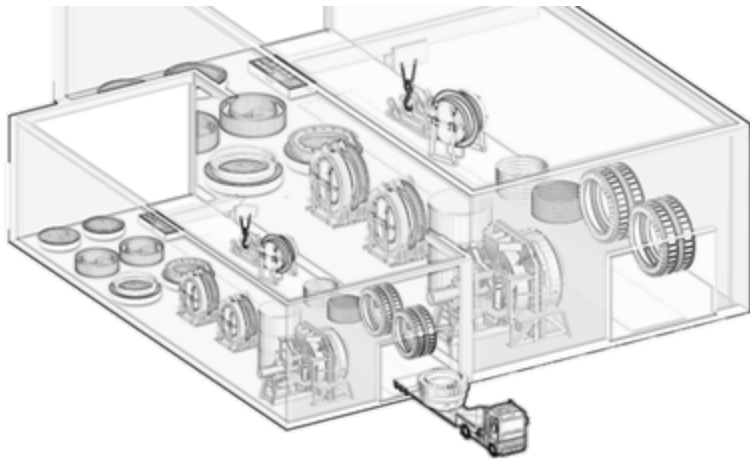
# ALSTOM tidal short & medium term industrial strategy

## NACELLE

Design, assembly & testing

- Generator
- Shaft & bearing

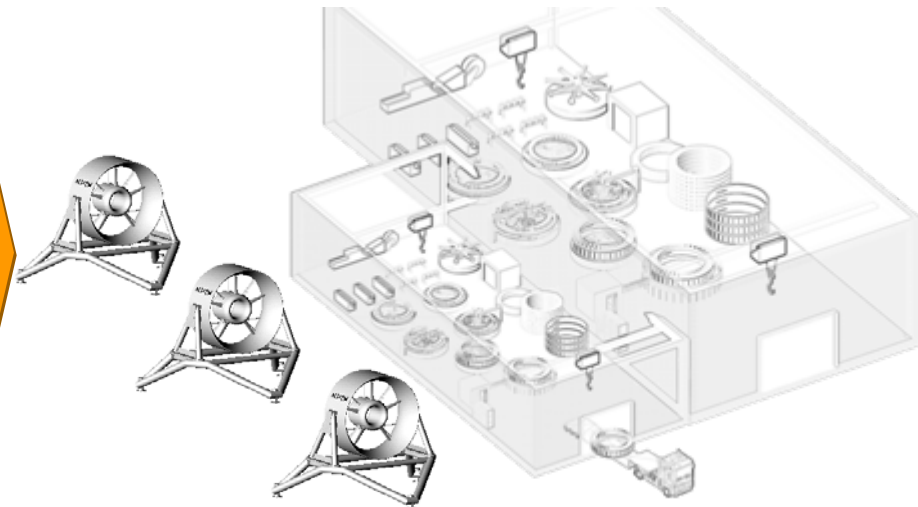
One workshop : 100 MW/yr  
(centralized)



## TISEC

- Final assembly
- Maintenance

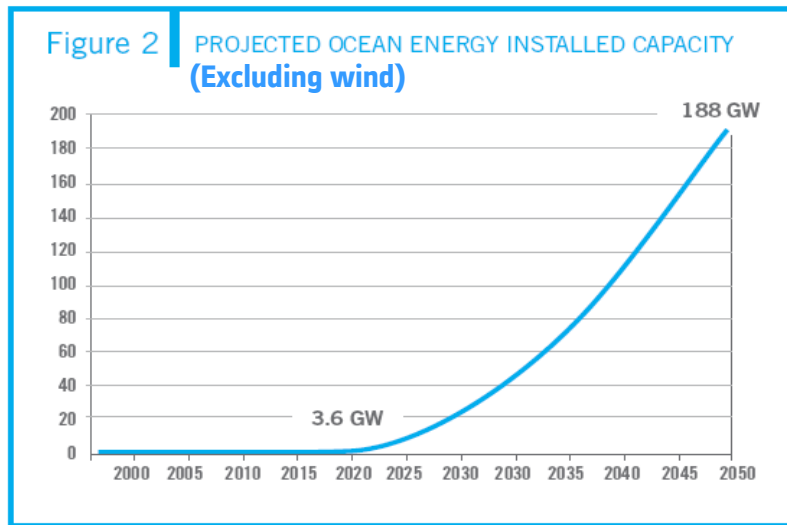
One facility per tidal farm  
(de-centralized)



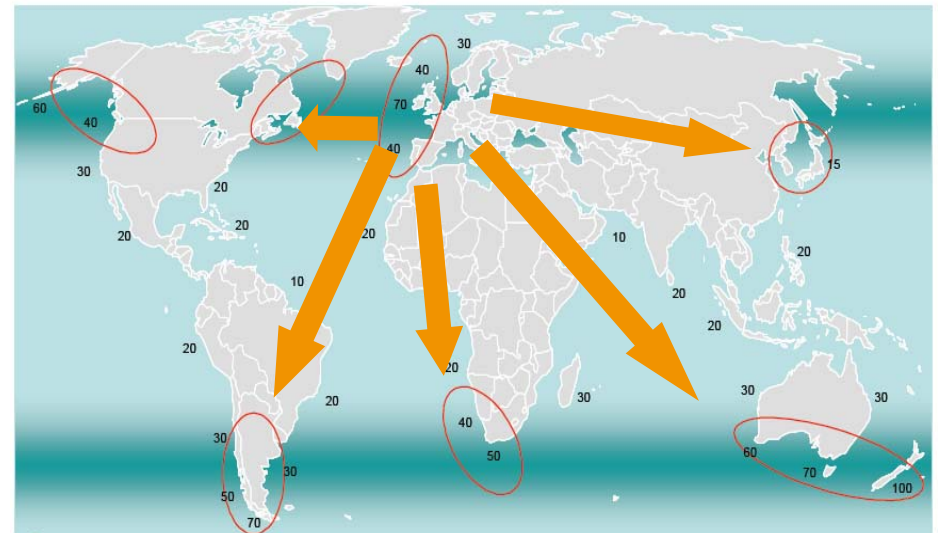
Focus on strategic added value

# Medium term opportunities

- Europe is blessed with enough resources to develop a real Ocean Energy market
- European products and skills can then be exported to the rest of the World



(Source : Oceans of Energy - EU OEA Roadmap 2010 - 2050)



Wave Energy highest potential zones

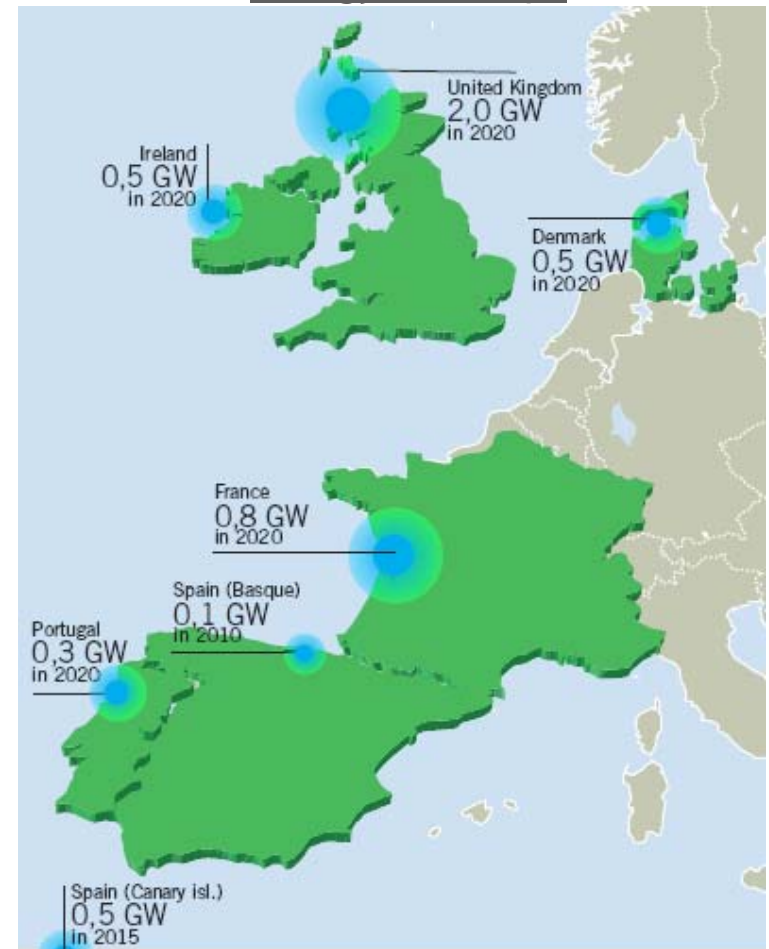
# Short term opportunities within Europe

## Ocean Energy (excluding Wind)

- Assuming :
  - ~ 3600 MW installed capacity by 2020
  - CAPEX ~ 4 M€/MW
- ⇒ ~ **14 b€ OEM market** from now to 2020
  
- Assuming ~ 70% is outsourced
- ⇒ ~ **10 b€ suppliers market** until 2020

⇒ Synergies with Off-shore Wind Market

## National targets for Ocean Energy in Europe



(Source : Oceans of Energy - EU OEA Roadmap 2010 - 2050)

# Conclusions

- Alstom is investing to become a world leader in the emerging Ocean Energy market
- This market represents a real opportunity for French industrial companies
  - A significant domestic resource exists
  - A large export market can be tapped
- Dedicated call for tenders should be organised in France soon to support the national industry

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